

**50 CFR Part 17****Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for *Cambarus zophonastes*****AGENCY:** Fish and Wildlife Service, Interior.**ACTION:** Final rule.

**SUMMARY:** The Service determines a cave crayfish, *Cambarus zophonastes*, to be an endangered species under the authority contained in the Endangered Species Act of 1973, as amended. This obligate cave dweller has been found only in one cave in Stone County, Arkansas. The species does not have an accepted common name. Groundwater contamination, collecting, and low population levels represent major potential threats to *Cambarus zophonastes*. Groundwater contamination is especially important because most of the stream channels in the cave's recharge area are sinking streams, which can readily introduce pollutants or contaminants into the cave system. This determination implements the protection of the Endangered Species Act of 1973, as amended, for this cave crayfish.

**DATE:** The effective date of this rule is May 7, 1987.

**ADDRESS:** The complete file for this rule is available for inspection, by appointment, during normal business hours at the Endangered Species Field Station, U.S. Fish and Wildlife Service, Jackson Mall Office Center, Suite 316, 300 Woodrow Wilson Avenue, Jackson, Mississippi 39213.

**FOR FURTHER INFORMATION CONTACT:**

Mr. Dennis B. Jordan at the above address (601/965-4900 or FTS 490-4900).

**SUPPLEMENTARY INFORMATION:****Background**

*Cambarus zophonastes* is an albinistic cave crayfish endemic to the White River Basin in north-central Arkansas (Smith 1984). This obligate cave crayfish was first collected in 1961 and described in 1964 from five specimens taken from the type locality (Hobbs and Bedinger 1964). *Cambarus zophonastes* lacks pigment in the body and eyes, which are reduced, and the overall body length reaches about 65 mm (2.5 inches). It can be distinguished from related species by the following features of its carapace: the rostrum has strongly convergent margins bearing spines, and the areola is more than 29 times longer than wide.

The species is known from only the type locality, and only eight specimens are known to exist in zoological collections. A search of over 170 additional caves in north-central Arkansas failed to locate any additional populations of *Cambarus zophonastes*. A survey of 436 caves and ten springs in Missouri revealed two closely related species (*Cambarus hubrichti* and *Cambarus setosus*), but failed to reveal *Cambarus zophonastes* (Smith 1984).

The type locality is situated in the Ozark Mountains, where the cave is formed in the Plattin Limestone (Hobbs and Bedinger 1964). This cave is a solution channel, most of which is wet year-round. It contains much mud, and many of its passages are flooded during storms and wet seasons. About 150 feet (45 meters) inside the cave entrance is a pool that ranges from 1 to at least 20 feet (0.3-6 meters) in depth. A narrow, shallow stream from the cave's interior enters the pool. This stream flows through 1400 feet (425 meters) of cave passage (Smith 1984). Water exits the cave through three springs that emerge about 150 feet (45 meters) from the cave entrance. The crayfish has been found only in the cave pool. The Arkansas Natural Heritage Commission and the Nature Conservancy recently purchased a 160-acre (65-hectare) tract that includes the cave's entrance. The cave's primary recharge area covers 3.51 square miles (9 square kilometers) (Aley and Aley 1985) and is largely privately owned. Population trends for *Cambarus zophonastes* have not been documented. The largest number of individuals sighted during a single trip was 15 crayfish recorded by a scuba diver in 1983. The total population is estimated at fewer than 50 individuals (Smith 1984).

The Service published a proposed rule to list this species as endangered in the **Federal Register** (51 FR 16569) on May 5, 1986.

**Summary of Comments and Recommendations**

In the May 5, 1986, proposed rule (51 FR 16569) and associated notifications, all interested parties were requested to submit factual reports or information that might contribute to the development of a final rule. Appropriate State agencies, county governments, Federal agencies, scientific organizations, and other interested parties were contacted and requested to comment. Newspaper notices that invited public comment were published in the *Arkansas Gazette* on May 25, 1986, and the *Arkansas Democrat* on May 24, 1986. Comments were received from two State agencies, one conservation organization, and one

individual. All four comments supported the proposed listing.

**Summary of Factors Affecting the Species**

After a thorough review and consideration of all information available, the Service has determined that *Cambarus zophonastes* should be classified as an endangered species. Procedures found at section 4(a)(1) of the Endangered Species Act (16 U.S.C. 1531 *et seq.*) and regulations (50 CFR Part 424) promulgated to implement the listing provisions of the Act were followed. A species may be determined to be an endangered or threatened species due to one or more of the five factors described in section 4(a)(1). These factors and their application to *Cambarus zophonastes* are as follows:

**A. The present or threatened destruction, modification, or curtailment of its habitat or range.** Groundwater contamination represents a major threat to *Cambarus zophonastes*. The only known population is in a geographic area characterized by sinking streams. A sinking stream is a surface watercourse that loses significant quantities of water into the subsurface in very localized areas. Sinking streams are of extreme importance in supplying water and nutrients to caves. This rapid flow of water into caves also allows the easy introduction of pollutants. A hydrological study of the area (Aley and Aley 1985) has identified several threats to the habitat of *Cambarus zophonastes*. An electrical transmission line crosses the recharge area for this cave. The use of herbicides to clear the right-of-way for this line could contaminate the cave.

A State highway borders the recharge area for the cave and is a potential source for accidental spills of materials hazardous to water quality. A 4,000 gallon (15,140 liter) spill of gasoline occurred in March 1985. There are three industrial operations within the cave recharge area that threaten the water quality. All three operations store petroleum products that could spill or leak into the cave. One of the operations, a concrete plant, contributes silt to the cave when its sediment ponds overflow (Aley and Aley 1985). The City of Mountain View has grown rapidly and will likely expand into the topographic basin, within which some subdivision roads have already been built. Continuing development presents a major threat to water quality in the cave from the use of septic tanks to dispose of wastewater.

**B. Overutilization for commercial, recreational, scientific, or educational purposes.** Obligate cave species

characteristically live longer and have considerably lower reproductive abilities than their surface relatives. Cooper (1975), in his study of crayfish in Shelta Cave, Alabama, found that female *Orconectes australis* carried only 10 to 60 attached ova, while surface species of *Orconectes* carry up to 574 attached ova. *Cambarus zophonastes* probably also has low reproductive capabilities. The removal of adults from a limited population with a likely low reproductive potential would seriously endanger the existence of the population. With a maximum of 15 individuals of *Cambarus zophonastes* ever observed and with a total population estimate of 50 individuals, the removal of any reproducing females would dramatically impact and could eliminate a year's recruitment. The limited habitat and population size make the species vulnerable to vandalism and taking.

C. *Disease or predation.* Disease and predation have not been documented for this species.

D. *The inadequacy of existing regulatory mechanisms.* This species is not recognized or protected as a rare species by any existing Federal or State regulation. Arkansas requires a scientific collecting permit for collecting any species, except taking for fish bait under other State regulations. This affords very limited protection owing to the difficulty of apprehending violators and limited resources for law enforcement.

E. *Other natural or manmade factors affecting its continued existence.* Obligate cave species apparently have very low reproductive rates, as evidenced by the limited information available on other cave species (Poulson 1961). The low fecundity is partially due to the limited energy availability in caves. The cave occupied *Cambarus zophonastes* likely served as a maternity roost site for gray bats (*Myotis grisescens*), a species listed as endangered, at one time in the past (Harvey *et al.* 1981). The abandonment of this roost site represents a loss of energy input, in the form of guano, to the cave's aquatic community. This loss of energy reduces the available food supply and may have limited or reduced the population size of *Cambarus zophonastes*. Reproduction of *Cambarus zophonastes* is further impacted by low numbers of mature individuals, which reduces genetic diversity and the likelihood of successful mating encounters. Low reproductive capabilities and the small, single population naturally limit this species' ability to recover from any adversity.

The Service has carefully assessed the best scientific and commercial information available regarding the past, present, and future threats faced by this species in determining to make this rule final. Based on this evaluation, the preferred action is to list *Cambarus zophonastes* as endangered. Endangered status was chosen because this species is known from only one cave system with an estimated population of 50 individuals. The species is especially vulnerable to water quality degradation at this site. It therefore requires the greatest possible protection available under the Act. The reason critical habitat is not being designated is discussed in the next section.

#### Critical Habitat

Section 4(a)(3) of the Act, as amended, requires that to the maximum extent prudent and determinable, the Secretary designate critical habitat at the time a species is determined to be endangered or threatened. The Service finds that designation of critical habitat is not prudent for this species at this time. As discussed under Factor B in the "Summary of Factors Affecting the Species," *Cambarus zophonastes* is endangered by taking, an activity difficult to prevent. Publication of critical habitat descriptions would make this species even more vulnerable and increase enforcement problems. All involved parties and landowners will be notified of the location and importance or protecting the species' habitat. Protection of this species' habitat will be addressed through the recovery process and through the section 7 jeopardy standard (see below). Therefore, it would not be prudent to determine critical habitat for *Cambarus zophonastes* at this time.

#### Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Endangered Species Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing encourages and results in conservation actions by Federal, State, and private agencies, groups, and individuals. The Endangered Species Act provides for possible land acquisition and cooperation with the States and requires that recovery actions be carried out for all listed species. Such actions are initiated by the Service following listing. The protection required of Federal agencies and the prohibitions against taking and harm are discussed, in part, below.

Section 7(a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened and with respect to its critical habitat if any is being designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR Part 402. Section 7(a)(2) requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of a listed species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with the Service. Federal involvement with this species is expected to be minimal. The continuing development of this region could lead to sub-surface water degradation which may involve the Environmental Protection Agency or other agencies with jurisdiction over the groundwater. The Federal Housing Administration may be required to consult with the Service on Federal loans for housing development within the cave's recharge area.

The Act and implementing regulations found at 50 CFR 17.21 set forth a series of general prohibitions and exceptions that apply to all endangered wildlife. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to take, import or export, ship in interstate commerce in the course of a commercial activity, or sell or offer for sale in interstate or foreign commerce any listed species. It also is illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken illegally. Certain exceptions apply to agents of the Service and State conservation agencies.

Permits may be issued to carry out otherwise prohibited activities involving endangered wildlife species under certain circumstances. Regulations governing permits are at 50 CFR 17.22 and 17.23. Such permits are available for scientific purposes, to enhance the propagation or survival of the species, and/or for incidental take in connection with otherwise lawful activities. In some instances, permits may be issued during a specified period of time to relieve undue economic hardship that would be suffered if such relief were not available.

#### National Environmental Policy Act

The Fish and Wildlife Service has determined that an Environmental Assessment, as defined by the National

Environmental Policy Act, need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Endangered Species Act of 1973, as amended. A notice outlining the Service's reasons for this determination was published in the **Federal Register** on October 25, 1983 (48 FR 49244).

#### References Cited

- Aley, T., and C. Aley. 1985. Water Quality Protection Studies. Hell Creek Cave, Arkansas. A contract report for the Arkansas Natural Heritage Commission.
- Cooper, J.E. 1975. Ecological and Behavioral Studies in Shelta Cave, Arkansas, with Emphasis on Decapod Crustaceans, Ph.D. Dissertation. University of Kentucky.
- Harvey, M.J., J.J. Cassidy, and G.G. O'Hagan. 1981. Endangered Bats of Arkansas: Distribution, Status, Ecology, and Management. A report to Arkansas Game and Fish Commission, Little Rock.

Hobbs, H.H., Jr., and M.S. Bedinger. 1964. A New Troglolitic Crayfish of the Genus *Cambarus* (Decapoda, Astacidae) from Arkansas with a Note on the Range of *Cambarus cryptodytes* Hobbs. *Proceedings of the Biological Society of Washington*, 77:9-15.

Poulson, T.L. 1961. Cave Adaptation in Amblyopsid Fishes. Ph.D. Dissertation, University of Michigan.

Smith, K.L. 1984. The Status of *Cambarus zophonastes* Hobbs and Bedinger, An Endemic Cave Crayfish from Arkansas. A status survey report for the U.S. Fish and Wildlife Service.

#### Author

The primary author of this final rule is James Stewart (see **ADDRESSES** section).

#### List of Subjects in 50 CFR Part 17

Endangered and threatened wildlife, Fish, Marine mammals, Plants (agriculture).

#### Regulation Promulgation

##### PART 17—[AMENDED]

Accordingly, Part 17, Subchapter B of Chapter I, Title 50 of the Code of Federal Regulations, is amended as set forth below:

1. The authority citation for Part 17 continues to read as follows:

**Authority:** Pub. L. 93-205, 87 Stat. 884; Pub. L. 94-359, 90 Stat. 911; Pub. L. 95-632, 92 Stat. 3751; Pub. L. 96-159, 93 Stat. 1225; Pub. L. 97-304, 96 Stat. 1411 (16 U.S.C. 1531 *et seq.*).

2. Amend § 17.11(h) by adding the following, in alphabetical order under CRUSTACEANS, to the List of Endangered and Threatened Wildlife:

##### § 17.11 Endangered and threatened wildlife.

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(h) \* \* \*

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
CRUSTACEANS							
Crayfish (no common name)	<i>Cambarus zophonastes</i>	U.S.A. (AR)	NA	E	263	NA	NA

Dated: March 24, 1987.

Susan Recce,

Acting Assistant Secretary for Fish and Wildlife and Parks.

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